of the cutaneous nerves by the varnishing may be sufficient to paralyze these centres. This would account for the phenomena. The nervous symptoms, such as hyperæsthesia, partial anæsthesia, reflex tetanic convulsions, partial paralysis, etc., are sufficiently accounted for by the congestion of the gray matter of the cord. Then the very marked reduction of temperature may be due to the increased radiation of heat in the hyperæmic cutaneous vessels. It is to be noted that the author's microscopic specimens were looked over, and his facts confirmed, by the distinguished histologist Frey.

6. *On the Alkalinity of Urine.*—V. Feltz and E. Riter (*Journal de l'Anatomie*, February, 1874, p. 311) have conducted a series of observations on the human subject, and made experiments on dogs, upon this subject. They arrive at the following conclusions: 1. The urine is only very rarely ammoniacal except in affections of the genito-urinary apparatus. The occurrence of alkalescence in the great majority of cases is to be ascribed to defects in the vessels, or to the mixture of the urine with more or less altered albuminous substances. 2. Urine placed in contact with the ammoniacal ferment, whose activity has been tested by its action on a solution of pure urea, does not undergo the ammoniacal fermentation with such rapidity as might appear from its composition. 3. The urine of sound healthy animals exempt from vesical or renal affections, does not become ammoniacal by prolonged retention in the bladder, produced by different mechanical methods. 4. Catheters impregnated with the ferment are not sufficient to render the urine of healthy animals ammoniacal. 5. The urine becomes ammoniacal temporarily, when a catheter, impregnated with the ferment, is allowed to remain in the bladder. 6. The same effect is produced on introducing into the bladder a solution of the ferment, and retaining it by mechanical means for about twelve hours. 7. Uræmia cannot be ascribed either to the retention of urine, or to the carbonate of ammonia produced by the decomposition of urea; for the former of these two substances is innocuous, and the second does not produce convulsions, unless in concentrated doses, the production of which in the blood is difficult to admit. 8. The decomposition of urea into carbonate of ammonia only takes place under the influence of a ferment or chemical agents which we have not taken into account here. This decomposition does not appear to take place in the blood, for injections of urea and the ferment did not produce uræmia. 9. The chloride, sulphate, phosphate, tartrate, benzoate, and hippurate of ammonia, when injected in sufficiently concentrated solutions into the blood, produce, from a physiological point of view, effects similar to those of carbonate of ammonia. 10. These salts are rapidly eliminated by the urine and saliva; the tartrate and benzoate do not undergo their usual transformation. The urine never becomes ammoniacal; and the breath is free from ammonia. 11. These salts, though of such a strength in solution as not to dissolve the red blood-corpuscles, nevertheless modify the properties of the latter. This fact is demonstrated by examination with the microscope, and by analysis of the gases contained in the blood; the absorptive capacity of the red blood-corpuscles for oxygen is notably diminished; while, on the contrary, the resistance to the action of water and acetic acid is increased.—*London Med. Record*, June 10, 1874.

MATERIA MEDICA, GENERAL THERAPEUTICS, AND PHARMACY.

7. *Experiments on the Elimination of Alcohol from the Body.*—Dr. Anstie gives (*The Practitioner*, July, 1874) the results of experiments made by himself and Dr. Dupré to decide, if possible, the question whether alcohol to any appreciable extent escapes *unchanged* from the body of an animal which has digested it. With that view he examined the different secretions, etc., which might be channels of the elimination of alcohol.

1. As regards the kidneys, the experiments prove that they do not, practically speaking, eliminate any alcohol at all.

2. As regards the skin, the experiments prove that no considerable quantity of alcohol escaped in that way. It is only in the profound narcosis of dead-drunkenness that the skin gives off any quantity of alcohol that can be readily discovered by tests.

3. By the feces: The alcohol in the feces of a typhus patient whose daily allowance of brandy (in health he was almost a teetotaller) was six ounces, proved to be less than $\frac{1}{10}$th of a grain in 24 hours, according to the experiments of Dr. Dupré.

4. The lungs: Dr. Dupré's experiments, made during twelve days, show that about 3½ grains only of alcohol were eliminated during the period in the breath, of nineteen ounces swallowed.

Dr. Anstie considers that the subject of the elimination of unchanged alcohol may now be considered as closed, and that we can see our way to the discussion of other very important questions respecting the physiological *rôle* of alcohol. Dr. Parkes intimates that in the event of alcohol having *proved* to be destroyed in the body, it would be especially necessary, before coming to any decision as to its physiological value, to make out clearly the nature of its influence upon the elimination of carbon from the body. That task Dr. Anstie and Dupré are now engaged in.

"It is impossible," says Dr. A., "fully to appreciate the importance of the further inquiries which must be made respecting the action of alcohol unless we remember the actual state of physiological knowledge respecting the processes of alimentation. No physiologist of any standing at present doubts that hydrocarbons and hydrates of carbon by their consumption produce available force within the body, and, in fact, that the bulk of the work done in the organism is obtained from these substances. Alcohol, as Dr. Pavy remarks, stands in a peculiar position, being intermediate, as to composition, between these two classes of foods. Being, as it is, a most highly oxidizable substance, it would be strange indeed if its oxidation did not prove to be the mode by which alcohol disappears within the organism. And looking to the fact that Dr. Parkes and myself have from independent (and indeed opposite quarters) come to singularly close agreement as to the daily allowance of alcohol that can be taken without producing any narcotism or other visible disturbance in the organism, I think I may take it as conceded that quite 600 grains of absolute alcohol can be disposed of daily within the organism of an adult male without any perceptible injurious effect upon the bodily functions. Now, this quantity of alcohol is (theoretically) capable of generating an enormous amount of force; but it is equally certain that that force does not show itself under the form of heat. It is scarcely possible, therefore, but that the solution of the questions as to the action of alcohol in the body will also bring about the discovery of new physiological facts of great interest and importance:—

"1. If alcohol be a force-producing food, as seems by far the most likely, it is probably of great value in that capacity, on account of the rapidity with which its transformations take place. It is, however, abundantly certain that beyond a certain dosage (which is pretty clearly made out for the average, though of course there are individual exceptions in both directions) it becomes a narcotic poison of a very dangerous character in every respect, not the least disadvantage being that it cannot be eliminated to any considerable extent.

"2. If alcohol does not disappear by oxidation, it must undergo some as yet quite unknown transformation, after which it must escape unrecognized in the excretions. I have heard various attempts to suggest such modes of disappearance, but nothing, so far, which wears any air of probability.

"3. If alcohol, however, be indeed oxidized, and yet does not beget force which can be used in the organism, this would be the strangest possible discovery. Considering the very high theoretical force value of the 600 to 800 grains of absolute alcohol which millions of sober persons are taking every day, we may well be hopeless of any reasonable answer to the question—Why does not this large development of wholly useless force within the body produce some violent symptoms of disturbance?"

8. *Action of Chloral on the Blood.*—In a communication to the Paris Academy Drs. FELTZ and RITTER enumerate the following conclusions from experiments on this subject:—

1. A solution of chloral (titrated to a fifth) injected into a dog's veins, causes the death of the animal, if the dose exceed 0.25 gramme per kilogramme. The temperature falls some tenths of a degree, seldom one degree. The respiration, momentarily accelerated, is soon retarded, becomes tetaniform, and stops; and along with these phenomena may be observed a trembling of the respiratory muscles, great paleness of the mucous membrane, some convulsions of the ocular globe, and great dilatation of the pupil. The heart-beats increase in frequency, become irregular, and cease an instant after the respiration. Conscious sensibility disappears before reflex sensibility; the latter is followed by muscular atony. There is no lesion found in the blood or in the viscera; death appears to be due to the action of the chloral on the nervous centre which governs the respiration.

2. The effects produced are different when one injects into the animal only the dose of chloral necessary to anæsthesia, and maintains it in this state by successive injections of fresh quantities whenever the reflex sensibility appears to return. Death occurs after twenty-four hours or thirty hours at the most. The dose of chloral necessary to maintain anæsthesia continuously diminishes, and the interval of the injections is more and more extended; four or five hours before death all injection becomes useless. The number of inspirations and expirations diminishes slowly and progressively, and is at length reduced to five or six in the minute. The heart-beats are accelerated as the respiration diminishes; the pulse, small, weak, and thready, ceases to be perceived, while the noises of the heart still persist. The arterial tension, indicated by the hæmodynamometer, falls.

The temperature falls only one to six degrees (Cent.) during the first six hours; it rises again rapidly from this point. We have seen it reach seventeen degrees; nearly always death takes place between twenty-four and twenty-eight degrees.

The saliva flows abundantly during the first hours; it becomes exhausted from the time when the temperature and the tension are notably lowered. Urine and dung are excreted from time to time.

The urine contains hæmoglobin in solution, easily recognizable with the spectroscope. The search for colouring matters of the bile, by the most delicate methods, has always led to a negative result. In two cases we have found glucose, which reduced Barreswil's liquor, was rendered brown by potash, and fermented alcoholically with beer-yeast. The urine always remained acid. The red colour of the urine frequently coincides with ecchymotic spots in the digestive mucus. The lungs, the liver, and the kidneys, always hyperæmic, never presented infarctus.

The alterations of the blood are profound; the corpuscles, deformed, have lost their elasticity; the plasma presents a red colour, which increases more and more. The field of the microscope is rapidly covered with crystals of hæmoglobin. We may state that we have never observed the like after section of the peumonogastrics, though this operation brings on some phenomena similar to those which we have observed during chloralization. The alteration of the blood is further shown from analyses of gases of the blood made at different periods of the chloralization, and by the capacity of absorption of this liquid for oxygen with which it is agitated. Without insisting on these various points, we content ourselves with saying here that the arterial blood of a dog, shaken with oxygen, takes up 250 cubic centimetres per 1000 before chloralization, and only 175 before death.

3. The toxic action of chloral is sometimes manifested after the waking of the animal, when the chloralization has been prolonged for a dozen hours, and the temperature has fallen to 30° Cent. (86° Fahr.). The alterations of the blood and the urine are then the same as we have described.

The waking of the animal is more rapid, the less the temperature and pressure have been lowered. Reflex and conscious sensibility appear in the first place; it takes two or three hours for the ataxic movements to be regularized.

We have found, in studying the products of respiration, that the greater part of the chloral is exhaled without being transformed. The product of condensation, a little milky, had not the least odour of chloroform, but it reduced, in heat, an ammoniacal solution of nitrate of silver. This character is common to chloral and to chloroform; but a solution of this latter substance which should produce a reduction to the same degree as our liquid of condensation would have a manifest smell and taste of chloroform. The condensed product further renders green a mixture of bichromate of potassium and sulphuric acid; this character does not belong to chloroform but to chloral. We have been able to assure ourselves, also, of the presence of another organic substance, but the small quantity we have hitherto succeeded in isolating does not allow analysis.—*London Medical Record*, Aug. 26, from *Comptes Rendus*, Aug. 3, 1874.

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9. *Physiological Action of Chloral and Bromal Hydrates and Iodoform.*—Dr. McKENDRICK read a paper on this subject before the Medico-Chirurgical Society of Edinburgh (June 3, 1874). After referring to the researches of Rabuteau, Steinauer, and Dougall, he gave the results of his own experiments, which were made with the view of ascertaining the precise physiological action of bromal hydrate. He showed: 1. That the action was first on the cerebral hemispheres, afterwards on the ganglia at the base of the brain, and, finally, on the spinal cord; 2. That the extreme contraction of the pupil was the combined effect of paralysis of the sympathetic and irritation of the third cranial nerve; 3. That the action on the heart was caused, first, by irritation; and, secondly, by paralysis of the sympathetic; the substance also acted on the intrinsic ganglia of the heart; 4. That the action on the bloodvessels, causing dilatation, was the result of paralysis of the sympathetic; 5. That the action on the salivary glands, causing very profuse secretion, was the result partly of paralysis of the sympathetic, and chiefly by irritation of the vaso-inhibitory and secretory filaments in such nerves as the chorda tympani. He then compared the action of chloral with bromal, and finally described the result of a few experiments made with iodoform, which he employed in place of iodal, a compound he could not obtain, and the existence of which is doubted by many chemists. Into the question of the chemical changes ensuing in chloral and bromal hydrates while in the blood, Dr. McKendrick did not at present enter. He also showed that atropia arrests the excessive secretion of saliva, by paralyzing (as Heidenhain has shown) the chorda tympani. The President (Dr. R. Haldane), in thanking the author for his paper, remarked that its physiological interest was only equalled by its probable therapeutical value. A new era in the treatment of disease was dawning, as we were learning that the first stages of many diseases were really affections of the nervous system acting on the vessels, which conditions such experimental researches may enable us to treat.—*Brit. Med. Journ.*, June 27, 1874.

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10. *Injection of Chloral into the Veins.*—M. VULPIAN, in a communication made to the Acad. of Med. (June 2d), states that he has very frequently resorted to intra-venous injection of chloral as a means of producing anæsthesia in animals so as to facilitate vivisections; and that very often in dogs hematuria resulted and there was found very great renal congestion manifested by redness and ecchymoses in the substance of the kidneys.

He suspects the same effect might be induced in the human species, thus giving rise to lesions of the kidneys which might become permanent and perhaps result in Bright's disease. This consideration, he thinks, might induce surgeons to employ chloral as recommended by M. Oré.—*Archives Générale*, July, 1874.

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11. *The Diuretic Action of Digitalis.*—Dr. BRUNTON and Mr. HENRY POWER bring forward (*Centralblatt*, July 4, 1874) reasons founded on some recent experiments of theirs for rejecting the prevalent theory that digitalis increases the flow of urine by raising the blood-pressure in the arterial system. They injected digitalin in considerable doses into the veins of the dog, and drew off its

urine by means of a catheter. The injection was followed by great diminution or even total suppression of the flow of urine, while the blood-pressure rose simultaneously. After a time the latter again diminished, with, in some experiments, an immediate increase in the secretion of urine; whereas in others this did not occur until the blood-pressure had fallen below its normal state. In some experiments the rate at which the urine was secreted with a subnormal arterial tension was very considerable. Now, if digitalis owed its diuretic action simply to its power of increasing the blood-pressure, the secretion of urine ought to be considerably increased immediately after the injection, and to diminish *pari passu* with the blood-pressure. The experimental result is, however, exactly the opposite. The authors are therefore inclined to explain the diuretic action of digitalis by assuming that it stimulates the vaso-motor nervous system generally, while it exercises a special action on the vaso-motor nerves of the kidney. From this results a moderate contraction of the vessels of the whole body, with consequent increase of the blood-pressure; while in the kidney the contraction is excessive, and so puts an end to the flow of urine. As soon, however, as the stimulus to the vaso-motor nervous system is removed, the vessels of the kidney relax more quickly and more completely than the systemic vessels, so that the tension of the blood in the glomeruli of the kidney is still above the normal, although that in the general circulation is below it. This theory is further supported by the fact that albumen appears in the urine after the re-establishment of the secretion—just as Hermann has observed it to occur after mechanical obstruction of the circulation in the renal arteries. The authors consider that the action of digitalis may also be due in part to its direct effect on the secreting cells of the kidney, and they are at present investigating this point.—*Med. Times and Gaz.*, Aug. 1, 1874.

12. *Therapeutical Action of Quinia.*—M. Sée has been delivering at the Charité a series of clinical lectures on the therapeutical action of quinia, some notes of which may be of interest. He is one of the most advanced scientific therapeutists, and believes that the action of drugs in disease may be predicted and explained by their physiological action in health. It is impossible to give more than a general idea of the views advanced and ably expounded by references to the natural history of the various diseases and the known action of quinia in their different forms, especially with regard to malarial fevers and acute rheumatism. His general conclusions are as follows:—

In health quinia has a threefold action: firstly, it diminishes the frequency and force of the action of the heart; secondly, it lowers the tension in the arterial system; and, thirdly, it lowers the temperature, or prevents its elevation by exercise, etc. Whilst recognizing its action on the amœboid movements of the white blood-corpuscles, as shown by Cohnheim, Binz, and others, he does not regard this as of great importance.

In an able analysis of the various forms of malarial fever, and the teachings of experience as to the value of quinia in each, he concludes that the drug cannot be regarded as a specific or counter-poison—as (1) it does not prevent malarial poisoning when taken as a prophylactic; (2) it does not prevent recurrence after a variable period; and (3) it is useless in some of the most fatal forms, especially where the fever tends to assume a continued type. Moreover, he points out that in other fevers which present the characters of periodicity and the occurrence of initial rigor—*e. g.*, urethral fever from catheterism—quinia has an equally beneficial effect. He believes that the effect of quinia in ague is due to its threefold action, exerted chiefly during the period of rigor: by its action on the heart, it diminishes its frequency and force; on the peripheral arteries, it lowers their tension and produces dilatation; on the spinal cord and vaso-motor centres, acting as a sedative, it tends to diminish their excitability; and, lastly, it exerts a direct cooling action on the system generally; the latter, however, being the least important factor.

In acute rheumatism, M. Sée considers it by far the most valuable medicine; and states that he always returns to it with benefit after the trial of all other methods of treatment. Here, again, he sees in its physiological action the most precise indications for its use. Especially in its effect on the spinal cord

—in lowering its irritability, and thus diminishing the sensibility to pain; and lessening reflex excitability, and thus reducing irritation and the afflux of blood to the inflamed joints—does he consider that its value lies, its action on the vascular system and in lowering temperature being also beneficial. The dose which M. Sée recommends is from ½ to 1½ grammes (or 8 to 24 grains nearly) in the day; increasing it, however, to 2 or 3 grammes, or even more if needful. It may be mentioned that this mode of treatment is adopted by a large number of the leading physicians in Paris, either exclusively or with other means; and they all appear to be unanimous in its favour. It is only in the acute stages that M. Sée considers it beneficial, except for the relief of pain, and in this respect it is also useful in gout.—*Lancet*, August 8, 1874.

13. *Therapeutic Value of Ipecacuanha administered as an Injection.*—M. H. Chouppe states that in 1873 Dr. Bourdon first used the decoction of the root of ipecacuanha as an injection per anum in two infants attacked with severe diarrhœa; the results were most satisfactory. M. Chouppe was hence induced to try it in the diarrhœa of tuberculous patients, and met with equal success. The preparation and dose he has found best are as follows: Twenty grammes of bruised ipecacuanha root are boiled in 500 grammes of water divided into three parts, each portion being boiled on the root for ten minutes. The three decoctions are mixed together and boiled down to 240 grammes, to which are added about ten or twelve drops of laudanum. This is enough for two injections. For infants the dose is proportionately less, and no laudanum is added. Two injections are administered per diem to the patient, the first being given between 7 and 8 A. M., that is to say, two hours before food, the second about 8 P. M., that is to say about three hours after the last meal. Vomiting was never observed. M. Chouppe found that injection of decoction of ipecacuanha into the veins of an animal produced violent vomiting and remarkable *dryness* of the mucous membrane of the intestine. The chief substances taken up by water boiled on the root are emetine and tannin; and both appear to have a powerful influence in checking irritation. The conclusions he arrives at from the review of a number of cases of diarrhœa thus treated are: 1. That ipecacuanha, administered in the form of injection, produces very satisfactory results in the diarrhœa of tuberculous patients and in the choleriform diarrhœa of young children. 2. By this proceeding the disorders of the stomach frequently caused by ipecacuanha are avoided. 3. Injections per anum can be continued for a long time without producing any trouble of the digestive function, nor weakening of the patient. 4. Ipecacuanha under these circumstances seems to act by absorption.—*Practitioner*, July, 1874, from *Bull. Gén. de Thérap.*, June, 1874, also in *Le Progres Médical*, June, 1874.

14. *On the Action of Bromide of Potassium.*—In a note on an article by Professor Binz, of Bonn, on the therapeutic use of bromide of potassium, in which the potassium is regarded as the true depressor of the muscular and nervous systems, and the bromine as inert, Professor Tommasi makes the following remarks (*Il Morgagni*, January 1, 1874, and *Giornale della reale Accademia di Medicina di Torino*, June 10): "After many experiments in the use of the bromide of potassium, I believe I may express its action as follows: It has a positive action (1) in acute delirium, febrile or non-febrile; (2) in the eclamptic, epileptic, and epileptoid states; (3) in headache, but in a much less degree.

"On the other hand, I have found it completely useless in cases of insanity (*alienazioni mentali*); in the peripheric forms of nervous disease; in spinal irritation; in angina pectoris; and in asthma.

"It certainly has some hypnotic action, but does not approach chloral. In acute delirium I have given as much as eight grammes (two drachms) daily, and in epilepsy twelve grammes (three drachms), always with advantage, in the sense of diminishing the violence of the paroxysms. I know one case of epilepsy which may perhaps be said to be cured. On the other hand, I have given the bromide in large doses in cases of alternating convulsions without observing any effect to be produced.

"I have often used it in spermatorrhœa and priapism and in the irritative stage of spinal disease.

"I place but little credit in Binz's opinion, that all the effects are to be attributed to the potassium; I believe that in the cases referred to the medicine did good as bromide."—*London Med. Record*, July 15, 1874.

15. *Physiological and Therapeutical Researches on the Monobromide of Camphor.*—The *Practitioner* for August last, and also *Le Progrès Médical* for June 20th, contain a very interesting report by Dr. BOURNEVILLE, of Paris, of his experimental researches respecting the properties of monobromide of camphor. From his experiments, amounting to about forty, he considers himself entitled to attribute to mono-bromide of camphor powerful sedative properties, and to draw the following deductions:—

1. *Monobromide of camphor* diminishes the number of *beatings* of the *heart*, and *determines contraction of the bloodvessels of the ears and eyelids.* 2. *It diminishes the number of inspirations.* 3. *It lowers temperature in a regular and constant manner.* In fatal cases the lowering increases to the end. In those which recover, the lowering is followed by an elevation of temperature, which returns to its initial figure, but in a longer time than that during which the lowering was effected. 4. *Monobromide of camphor possesses undeniable hypnotic properties. It seems to act principally on the cerebral nervous system.* 5. *It does not seem that the medicament is got accustomed to; and its protracted use determines rather rapid loss of flesh in cats and guinea-pigs.*

16. *Apomorphia as an Expectorant.*—Dr. JURASZ, assistant at the Medical Dispensary at Heidelberg, has found apomorphia in the shape of the hydrochlorate, and administered in doses of one to three milligrammes every two hours, a valuable expectorant in cases of tracheitis and in bronchitis in its various forms. By its use the expectoration is rendered easier and more abundant, to the great relief of the patients, while the physical signs show a corresponding change from dry whistling rhonchus to plentiful moist râles, which gradually disappear. Dr. Jurasz adds a few drops of hydrochloric acid to the mixture in which the apomorphia is dissolved, to prevent the formation of the greenish tint which otherwise occurs, and which deepens the longer the solution is kept. The only ill effect which patients have complained of from the drug is slight nausea after the first dose, but this has disappeared after a second dose.—*Med. Times and Gaz.*, Aug. 1, 1874.

17. *Subcutaneous Injection of Hydrochlorate of Morphia.*—M. CHOUPPE, who has performed many subcutaneous injections with the hydrochlorate of morphia, asserts that they act more promptly the nearer they are made to the seat of pain. Further, he says they are less painful than an injection of distilled water, and produce neither œdema nor any other local irritation.—*Tribune Médicale*, July 12, 1874.

18. *Valerianate of Amyl.*—Dr. W. F. WADE, of Birmingham, states (*Brit. Med. Journ.*, June 6, 1874) that "a spirit of the valerianate of amyl, to which a few drops of acetate of amyl (known in commerce as essence of Jargonelle pear) have been added, is, without any qualification or exception, not only the most elegant known preparation of valerianic acid, but intrinsically an agreeable drug. All these spirits improve in odour by a little keeping. I find that, to some stomachs, ethers are repugnant, unless well diluted; and six or eight drops of the compound spirit are, generally speaking, sufficient for an ounce of water, and also an adequate dose."

Dr. W. terms this "sp. amyl. valer. co." It consists of one part of ether to ninteeen of spirit. To two ounces of this are added twenty minims of a spirit of acetate of amyl made in the proportion of one in twenty.